ORION

AUGUST 2019

Testing 1, 2, 3: Orion Passes Moon Mission Trials

ORION'S SERVICE MODULE COMPLETES CRITICAL PROPULSION TEST

On Aug 5., engineers at NASA's White Sands Test Facility near Las Cruces, New Mexico, tested the Orion spacecraft's service module with a ground-based firing of its propulsion and pressurization systems.

The 12-minute firing simulated an abort-to-orbit scenario – in which the system would fire long enough to place Orion in a safe, temporary orbit in the event of an issue setting Orion in the precise trajectory required to get to the Moon. That temporary orbit would allow time to evaluate the crew and spacecraft before deciding to either continue with an alternate mission profile or return to Earth.

A test version of the propulsion system was used to fire Orion's main engine and all eight of its auxiliary engines simultaneously. Each of the six reaction control thrusters were also periodically fired throughout the test to simulate attitude control and overall propulsion system capacity.

At NASA's Kennedy Space Center, the recently completed crew module and service module are being stacked and processed for future integration with the Space Launch System (SLS) rocket for Artemis I, the first, full-test flight of the SLS and Orion as it is sent around the Moon. The uncrewed test will precede Artemis II, the first flight with astronauts aboard, and both will pave the way for the first woman and the next man to land on the Moon by 2024, while preparing for future missions to Mars.

Watch the full test video: **https://go.nasa.gov/2OjhCaL**

ORION HOT FIRE TEST BLAZES A SAFE TRAIL FOR NASA MISSIONS TO THE MOON

The attitude control motor designed to help the Orion spacecraft's Launch Abort System steer Orion and its crew to safety in an emergency during launch was successfully tested on Aug. 22 by engineers at Northrop Grumman's facilities in Elkton, Maryland.

The 30-second trial by fire was the second to last test before it is fully qualified for human space flight on Artemis II—Orion's first mission with astronauts. Orion's attitude control motor (ACM) produces more than 7,000 pounds of thrust from eight valves to steer Orion and its crew to a safe distance in case of an abort. Once the final qualification test is completed later this year, the ACM motor will be certified for future crewed flights.

Watch the test here: **https://youtu.be/-V2WZ5tApoc**

ARMSTRONG TEAM PLAYS CRITICAL ROLE IN AA-2 FLIGHT TEST

Pictured L to R: Griff Corpening, Pat Soliker, David McBride, Don Reed

NASA's Armstrong Flight Research Center staff were in the control rooms when the agency successfully tested the Orion spacecraft's launch abort system during the Ascent Abort-2 (AA-2) flight test at Cape Canaveral, Florida on July 2. The system is designed to take astronauts to safety in case of an emergency during ascent.

About a dozen people from the California NASA center were monitoring systems the team had developed and tested. Armstrong had a number of tasks for the AA-2 flight test, which was a key milestone in preparation for Artemis missions to the Moon, eventually leading to astronaut missions to Mars.

Team members made critical contributions to the Orion AA-2 Developmental Flight Instrumentation (DFI) subsystem. This crucial subsystem collected and transmitted all of the engineering data and onboard video that will allow the Orion AA-2 engineering team to determine whether or not the 38 mission objectives were successfully achieved.

On Aug. 28, AA-2 Flight Test Manager Don Reed and Deputy Manager Griff Corpening presented an award to the AA-2 DFI team for their work on the flight test. Center Director David McBride and Deputy Director Pat Soliker also accepted an AA-2 award for the Center.

NASA Armstrong Flight Research Center's AA-2 DFI team

COLORADO AND TEXAS TEAMS CONDUCT ASCENT SIMULATION

Teams from Colorado and Texas conducted a flight simulation in late August, testing out preliminary flight procedures for the Artemis I mission. The test, also known as the Artemis I Ascent Simulation #2A, was led by the Flight Control Team in the Mission Control Center in Houston, Texas, and the Interim Cryogenic Propulsion Stage (ICPS) support team at United Launch Alliance in Denver, Colorado.

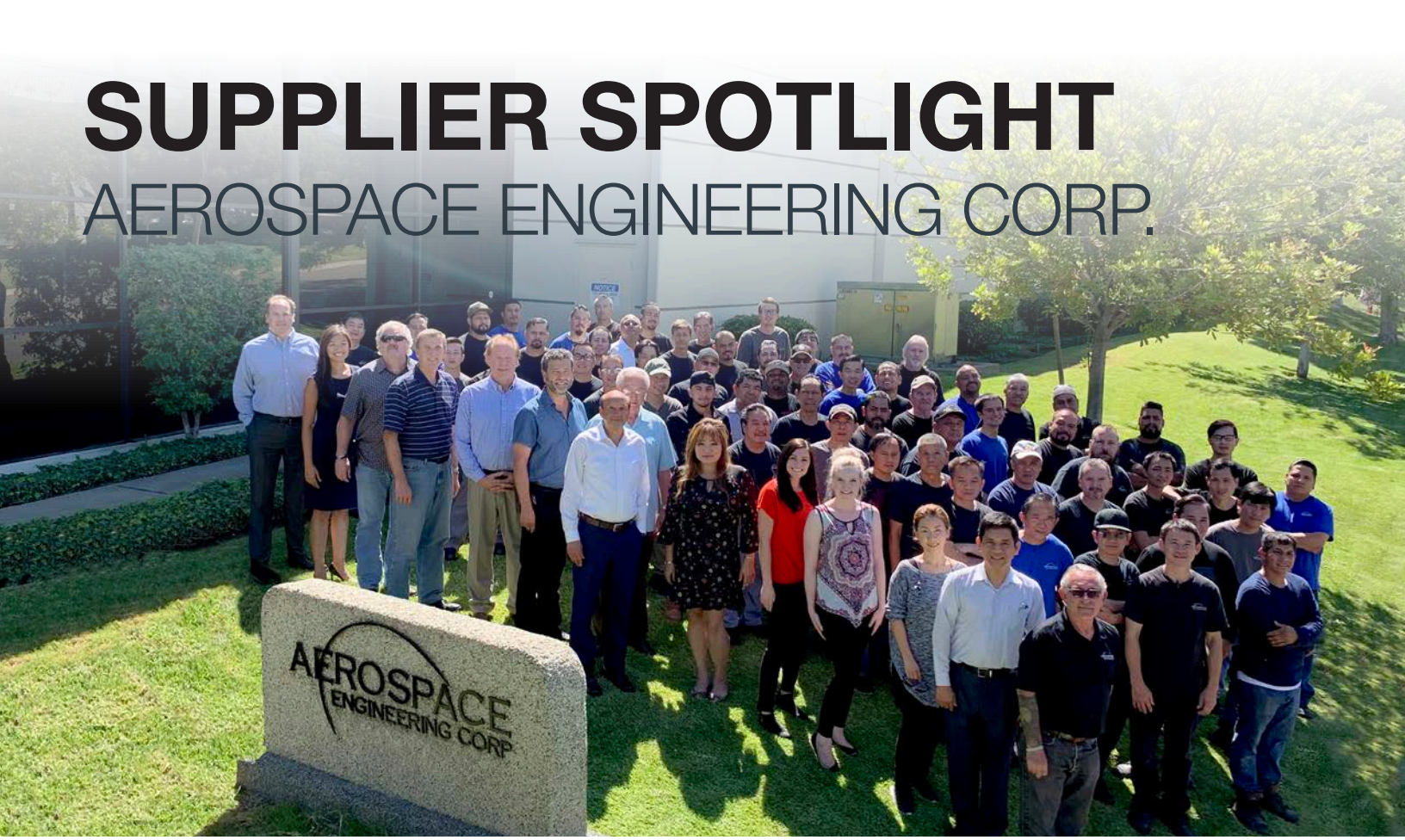
During the mission rehearsal simulation, teams rehearsed preliminary flight procedures, flight rules, telemetry displays, console tools, team communication and recognition and response to in-flight failures. The simulation consisted of three ascent "runs." These tests were created using a program package known as "SOCRRATES" to simulate the Orion crew and service module performance in conjunction with previously recorded trajectory and telemetry.

Congressman Randy Weber (R-TX-14th District) visits with Orion Program Manager Mark Kirasich and checks up on Orion progress during his trip to NASA's Johnson Space Center on Aug. 30.

Orion Assistant Manager for Strategy Integration Paul Marshall met with Senator Ted Cruz' (R-TX) Authorization Committee staffer Dunkin Rankin, during his visit to NASA's Johnson Space Center on Aug. 22.

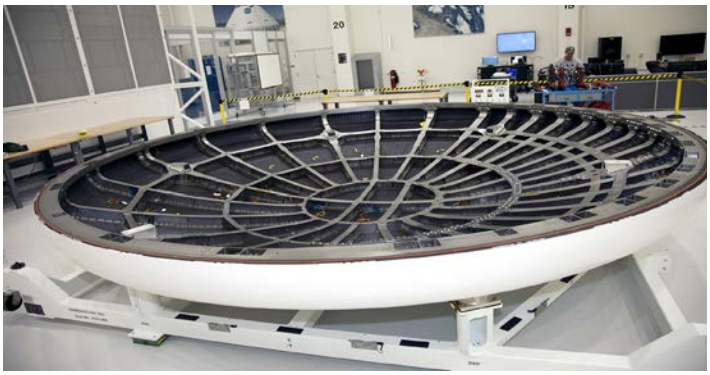
SUPPLIER SPOTLIGHT

AEROSPACE ENGINEERING CORP.



Aerospace Engineering Corp. (AEC) is a small business company located in Brea, California, that is rising as one of the leading suppliers for NASA's future space endeavors. As a member of the Orion spacecraft team, AEC was selected for the critical task of building the 205-piece 16.5 feet diameter titanium support structure (pictured here) for the largest heat shield on the planet. This structure maintains the integrity of the heat shield during re-entry through the atmosphere at about 25,000 miles per hour. It can withstand surface temperatures of 5,000 degrees Fahrenheit during re-entry and more than 300,000 pounds of force during landing.

AEC's contribution to the Orion program goes beyond the heat shield support structure and includes many other key articles such as the astronaut console, aft gussets, shear panels, mid and forward ring segments, clevis upper struts, aeroseals, deflectors, longerons and the aft interstage.



FOLLOW THE PROGRESS OF NASA'S NEW SPACECRAFT FOR HUMAN EXPLORATION:

Twitter ..... **Twitter.com/NASA_Orion**

Facebook ..... **Facebook.com/NASAOrion**

Flickr ..... **Flickr.com/NASAOrion**

Tumblr ..... **NASAOrion.tumblr.com**

- **Roundup Presents: The Directors Series – Mark Kirasich**
  https://go.nasa.gov/2nfZG63
- **"Houston We Have a Podcast": Orion crew systems integration**
  https://go.nasa.gov/30H3DOS
- **Astronaut Lee Morin explains Orion's role for the future**
  https://bit.ly/32YqzKJ